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CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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S E C R E T

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25X1

[redacted]

Work at Bleicherode (N 51-26, E 10-35)

Development of Zentralwerke

2. [redacted] in September 1945, there were a number of institutes and factories in East Germany which dealt with the reconstruction of German rocket weapons. In Bleicherode there was the Raabe Institute, which collected and completed 25X1

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25 YEAR RE-REVIEW

A-4 rocket designs and reconstructed the electrical equipment. In Klein-Bodungen (N 51-28, E 10-32) the former repair workshop for A-4 equipment was transformed into an assembly workshop. Moreover, a group of technicians at Mittelwerke was charged with the task of putting down on paper the manufacturing process of the A-4 as well as the organization of the plant prior to its dismantlement. These three institutes came under the Nordhausen Special Commission. In Lehesten (N 50-28, E 11-27) the existing test stands and the O_2 installation were used for carrying out experiments with A-4 combustion chambers. In Peenemunde (N 54-08, E 13-47) there was a dismantling commission which also committed to paper the complete details of the installations. Finally, there was the GEMA in Berlin, which dealt with the problems of controls and antiaircraft rockets. [redacted] 25X1 the GRO Byuro, which was to complement the work of other [redacted] a large number of university institutes for this work and created a circle of about thirty people working in Bleicherode. Later, a second task was added: the planning of the FMS, a mobile (railroad) experimental station for A-4 rockets, equipped with all requisite equipment [redacted] The 25X1 Zentralwerke was founded and, in addition to the existing installations in Bleicherode, Klein-Bodungen, Lehesten, and Peenemunde, several other bureaus and factories were newly established, such as Werk II in Nordhausen (N 51-00, E 10-51) for power plant equipment assembly, and Werk I in Sömmerda (N 51-10, E 11-08) for body assembly, as well as two design offices for power plant and ground equipment. A large design office and several laboratories were also established at Sömmerda. In Lehesten a test stand for the testing of the complete A-4 rocket was built. A factory for electrical equipment was established at Sonderhausen (N 51-21, E 10-52). In summer 1946 suggestions were put forward for the improvement of the work by concentrating all the workshops in one place; however, this plan was not carried out. In autumn 1946 the total of employees in the Zentralwerke rose to 5,500 men.

A-4 Rocket

3. The main task at the Zentralwerke was the reconstruction of the A-4 rocket and the necessary associated installations and equipment. This reconstruction consisted of the completion of the design data for the rocket and its components, and the completion of the ground installations required for the testing and launching of the rocket, as well as for the manufacturing jigs and the testing equipment required during manufacture. The design data covered the description and the operational instructions for all parts of the rocket, the ground installations as well as theoretical data on ballistics, aerodynamics, and controls. Secondly, the reconstruction also included the setting up of a production line for the rocket. [redacted] The pro- 25X1 duction program of these workshops was generally not concerned with the manufacture of component parts from raw materials, but assembled ready-made components. Complex components such as pneumatic and hydraulic fittings and control gear were already in existence. The manufacturing workshops assembled about thirty rockets. Approximately half of them were made ready for launching, while of the other half, the main assemblies, such as control unit, middle parts, stern, and motor, remained as separate unassembled main components. The third stage of the reconstruction was the testing of the ground installations for launching and use by military personnel. Two FMS trains of about a hundred cars each were built, and their equipment with workshops, laboratories, and offices was far more elaborate than that normally supplied to the front. According to instructions, one Soviet and one German testing and launching crew were trained and burning tests were made by these crews with the complete rocket on test stand 3 in Lehesten. The completion date for the reconstruction of the A-4 was 15 September 1946 and the work was more or less completed by that date.

Improvement of the A-4 Rocket

4. A large number of Soviet engineers, scientists, and officers worked [redacted] in- 25X1 tensively on the reconstruction of the A-4 and constantly supported and supervised the work of the Zentralwerke. However, there was less interest in the second

large task, namely, the further development of rockets [redacted] 25X1
[redacted] In summer 1946 the designers, scientists, and Zentral- 25X1
werke engineers assembled for the first development consultation in Bleicherode. Before this conference an invitation was issued for the submission of proposals for the improvement of the A-4 rocket. During the conference the approximately 150 submitted proposals were examined and about half of them forwarded for further development. The developed proposals were tested individually by expert commissions and submitted to a plenary conference for a second consideration on 21 October 1946. In this way, a number of different rocket types were developed, in each of which some of the proposals were to be embodied. These types were supposed to be designed as projects. Most of the improvement proposals remained within the Peenemunde plan. Only some of the proposals were new and radical departures from the general design, e.g., the self-supporting, pressure-stabilized fuel tanks, the abolition of the control gear in the head, and the operation of the turbo-pump by means of cooled exhaust gas. It is not necessary to discuss these proposals in detail because those which in our opinion were practicable were combined in Project R-10, which we shall discuss later.

Future Development Aspects

5. As regards work beyond the field of improving the A-4, [redacted]: 25X1
in August or September 1946 [redacted] from Moscow, through the Special Commission, 25X1
the instruction to draft a development plan for the improved A-4 as well as for a rocket with a range of over 2.500 km. [redacted] 25X1
[redacted] The plan was based on the traditional Peenemunde Projects A-9 and A-10 with a very few alterations, which arose from some quite new considerations. The development of technical details was not included in the plan.

Work in the USSR

Grouping of the Staff

6. On arrival in Moscow, the German experts were assigned to various ministries. A number of key experts of the Zentralwerke went to the Ministry of Communications and the Ministry of Aviation Industry. The majority of the Zentralwerke people remained [redacted] and were joined by a number of persons from the so-called GEMA Berlin and others. [redacted] 25X1

25X1

7. There was a delay in starting work. The manufacturing personnel were transferred, after two months' idleness, to the pattern production of the A-4 in NII 88 in an advisory capacity. The experts on controls started building a Bahnmodel, which was completed within four weeks and forwarded, together with technical documents, to NII 88. The other experts wrote more or less useful reports from memory. On Gorodomlya Island the situation was even worse, as practically no preparations had been made either for the work or the private life of the experts and their families. The situation improved in the course of years. After some changes the entire German staff was transferred to Gorodomlya Island in spring 1948. [redacted] 25X1

A-4 Rocket

8. Just as in Bleicherode, the only task on which work was urgent in Moscow, at first, was the reconstruction of the A-4. The rockets which were brought from Germany 25X1
were tested anew, and those which were brought over in sections were assembled. These rockets were later referred to as Soviet rockets. In autumn 1946, [redacted]
[redacted] several German experts, some of them from other ministries, to the launching 25X1
site at Kapustin Yar. Eight thousand workers had built a launching installation, a test installation for horizontal tests, and a test stand for the burning of complete rockets. Several different burning tests were made and about twenty rockets

fired. In view of the age of the rockets, the percentage of misfiring was not particularly high. Minister of Armaments Ustinov and his staff, as well as a large number of key Soviet military people, were present at the tests. These firing tests were the end of [redacted] work on the A-4, apart from the evaluation of the firing trials, 25X1
which was completed by our ballistics group in summer 1948.

25X1

Chronological Details of the R-10 Rocket

9. While [redacted] still engaged in the further development of the A-4 [redacted] began work on the R-10 rocket. [redacted] 25X1
[redacted] luckily forced to start from scratch. Even before [redacted] trip to Kapustin Yar, [redacted] documents on the new R-10 rocket were so far advanced that [redacted] could submit them to the Scientific-Technical Council of Institute 88. 25X1
However, the Council rejected [redacted] draft because it was not worked out in sufficient detail and requested [redacted] to submit the same project once more within a year. That was done in December 1948 and on that occassion [redacted] were completely successful. 25X1
The Council confirmed [redacted] were working in the right direction and allocated some money for the necessary preliminary experiments. In 1949/1950 [redacted] carried 25X1
out some of the preliminary experiments [redacted] prepared some others, and made the working drawings for the rocket and the ground installation.

Technical Description of the R-10 Rocket

10. The essential features of the R-10 rocket were the following: The external form had been taken over from the A-4 rocket in spite of the completely new design of the body. The useful load was 1,000 kilograms and the calculated guaranteed range was 910 kilometers. The warhead was loosely fixed on the front tank and separated 25X1
from it at the time of fuel cutoff. The remainder of the device traveled on and, according to [redacted] calculations, would fall to the ground approximately 50-80 kilometers before the target. The middle part consisted of a fuel tank with an intermediate wall. The tank was stabilized through internal high pressure and, for static reasons, had to be kept under pressure even during tanking. There was, through design, no protection for the O_2 tank. Both tanks were filled from the ground through the stern. The O_2 tank was connected to a supplementary fuel feed tank until the moment of firing. The stern was outwardly similar to that of the A-4 rocket but had been redesigned completely for production reasons. The normal combustion chamber and the turbo-pump of the A-4 rocket had been utilized for the motor because these were components which required a long period of development. The turbo-pump was started with the exhaust gas, which came from the combustion chamber and was cooled with alcohol. The cooling of the exhaust gas as well as the pressure in the combustion chamber were automatically regulated.

11. The motor delivered 35 (German) tons' thrust. The starting process was examined [redacted] with particular care. The turbine was started with compressed air from a 25X1
ground installation, and shortly before the rocket started to rise the compressed air was replaced by exhaust gas from the combustion chamber. The fuel cutoff was sudden and not, as in the case of the A-4 rocket, by stages. The fuel valves were built as close as possible to the combustion chamber in order to ensure that only a small amount of fuel was contained between these two items. Both valves were started with explosive (powder) charges. The resultant water shock was rendered harmless by by-pass methods. In order to obtain a booster impulse (which could be calculated) from the combustion of the fuel remaining between the valves and the combustion chamber, the remaining oxygen was blown into the combustion chamber under pressure. A further improvement of the fuel cutoff process was effected by fixing two braking rockets with great impulse and short combustion duration to the junction of the stern middle part. These braking rockets cut off the impulse transferred to the warhead.

12. The stern space contained the control equipment and the switchgear. The stability of the rocket was regulated by electrically-tied turn indicators (the so-called mixing gyros). The direction of the rocket changed after the start and was caught by a beam from a ground station about twenty seconds later. This beam was rigid and, therefore, did not deviate. There was a guide beam receiver on board which gave the necessary corrections to the mixing gyroscope. The return beam transmitter produced on the ground the Doppler frequency required for velocity measurement in the well-known manner. As the path ran straight at a well-known angle, the

corrections for the position and acceleration were simple to make and to apply. The rocket was guided through the usual graphite beam guide of the A-4 but without the air rudder. The steering devices were moved by pneumatic motors employing gaseous O_2. As the electric current had been reduced to about one-tenth of that of the A-4, the stotz plug contact could be replaced by a single pull-out plug switch on the stern fin.

13. The redesigning of ground equipment referred particularly to the fire control, which was effected from a small control box. It also referred to the ground connections which consisted of a few plain cables. The tanker had to be increased in size or in numbers and a special auxiliary tanker was necessary. There was no need for a test truck or tanking equipment for T and Z fuel. The guide beam, fuel cut-off station (sic) was about two kilometers behind the starting point and corresponded approximately to that of the A-4.

R-10 Aims and Means

14. [redacted] to summarize here the main aims [redacted] set [redacted] for this design. The first aim was an increase in range. This was partially effected by reducing the empty weight: as the body had only to be strong enough for the climb and no longer for re-entry, the weight of the body could be reduced by half. This was made possible by a design with pressure-stabilized tanks and a reduction in the weight of the stern. As compared with the A-4 rocket, the power plant weighed 200 kilograms less, in particular because there was no longer a T-fuel installation. The control, too, was reduced in weight; particularly, the heavy battery could be made much lighter. The second measure was the increase in diameter of the fuel tanks at the expense of the instrument chamber and the decreased power unit. The second aim was simplification. It is well-known that the A-4 rocket went into production as a laboratory prototype and, therefore, it was not difficult to effect considerable simplification. Simplification should be aimed at for the following reasons: cutting production costs which had a decisive influence on mass production; secondly, simplification of operation and consequent saving in the number and skill of personnel as well as avoidance of mistakes in operation; thirdly, cutting the time of preparation for the start (this had close connection with the second point); and, fourthly, a decrease in the possibility of faults, the usual concomitant of simplification. Simplification applied to all parts of the rocket. We have already discussed the body. In the power plant simplification was effected by the abolition of the steam installation. For this and other reasons it was possible, for example, to reduce the forty-five fittings of the A-4 rocket to twelve in the case of the R-10 rocket and, [redacted] there was no longer an electrical valve. Operation was considerably simplified by refuelling through the stern. The control became simpler mainly through a division of tasks, stability, and aim accuracy. Stability was controlled through cheap small gyroscopes. The guide beam device was no longer an auxiliary, but a main component; but that did not make it more complex. The guide beam device was alone responsible for accuracy. 25X1 25X1 25X1

15. The increased aim-accuracy demands had to be fulfilled by the ground installations. The rudder machinery became simpler, as it was not supplied, like all pneumatically worked devices, by special compressed air cylinders, but by oxygen under pressure, easily obtainable during flight. Finally, there were no longer any air rudders. Operation was effected from the lowest platform of the Meiller wagon; there was no need for higher platforms. In view of all these measures, and by means of fast fuel supply by pressure, [redacted] hoped to cut the preparatory period to 30 minutes. 25X1

16. The third aim was increased accuracy in regard to the target. While in the A-4 rocket the guide beam device and the verticant[1] shared the task of lateral steering, only the radio device was responsible for accuracy in the R-10 rocket. This separation of functions and the fact that the ground serial (sic) stood firmly increased the efficiency of lateral steering. However, the main factor in the improvement was simply the result of the vastly increased accuracy of the radar equipment. The principle of a straight starting track was even more decisive in regard to longitudinal control. The rocket was led into a rigid radio channel. Only in this way was it possible to determine the range from fuel cutoff and its velocity, path, and acceleration. Added to this was the shortening and precise determination of the fuel cutoff process itself. According to our calculations, control in both directions should not exceed 1 o/oo (sic) of the range.

R-10 Experiments

17. The development of the draft project and the work drawings was based on a number 25X1 of experiments, some of which [redacted] carried out ourselves, and some of which [redacted] prepared. 25X1 Static experiments were made to test the resistance of the danger spots of the tanks. In regard to the power plant, the problem of the exhaust gas utilization was dealt with by experiments which went on for years. On a specially constructed test stand in Gorodomlya, a combustion chamber was burned which supplied only just enough exhaust gas to operate the turbo-pump under extreme conditions.

18. After the first firing tests with the combustion chamber, a cooling system was attached and the exhaust gases were examined. Finally the exhaust gas was used to drive an A-4 turbo-pump. The experiments were carried out using exhaust from O_2/ alcohol and O_2/ paraffin mixture, utilizing water, alcohol, and paraffin as the cooling media. The experiments worked according to plan; the theoretical values were reached or slightly exceeded. Finally, the working of the test stand was rendered automatic to such an extent that combustion pressure, fuel mixture ratio, and gas temperatures could be fixed before the experiments by means of suitable control gear, after which the test proceeded automatically. In order to test the principle of gas tapping of the A-4 combustion chamber under full scale conditions, an extensive research program was drawn up in 1949/50. All the necessary test objects and test gear were designed and built, partly with the help of Institute 88. The experiments were carried out at Kapustin Yar without German participation in 1950. [redacted] indirectly, the results appear to have been 25X1 satisfactory. All control gear carried by the rocket was made by us and tested with the help of the track simulator. The radio installation was similarly built [redacted] and flight-tested on numerous occasions with the help of aircraft. The 25X1 state of the work in 1950 justified the construction of the first experimental type of rockets and ground apparatus and the carrying out of firing trials.

Paralled Soviet Developments

19. In the meantime, and in parallel with the R-10 project, Chief Designer Korolov (fnu) of Institute 88 was carrying out an idea which he had already discussed while [redacted] still in Germany. The object was to obtain an increase in range 25X1 of the A-4 rocket purely by lengthening the rocket and thus increasing the quantity of fuel carried. [redacted] Korolov [redacted] 25X1 his development work also incorporated in his project the individual war head, the control gear, and probably also the gas tapping, which formed characteristic features of the R-10 rocket. At any rate, work on a lengthened A-4 rocket was carried out at Institue 88 already in 1946 and the project was submitted to the Scientific-Technical Commission (Council?) in 1948. [redacted] heard rumors of trial firings about 1949 which were said to have been partially successful, but [redacted] never heard anything 25X1 definite about this project.

Chronological Details of the R-14 and R-15 Rockets

20. On the occasion of a visit to Gorodomlya in spring 1949, Minister Ustinov ordered [redacted] design as rapidly as possible a rocket capable of transporting a useful load of three tons over a distance of 3000 kilometers. Within three weeks, [redacted] 25X1 produced about 10 Avant projects including several multi-stage proposals. Out of these, two projects were chosen for detailed study, namely, a single-stage ballistic rocket (R-14) and a glider fitted with take-off rocket and jet propulsion (R-15). These two projects reached the draft proposal stage by December 1949. Although all the necessary data for a submission of the project to the Scientific-Technical Council were available, the Soviet authorities did not give [redacted] this opportunity. The material submitted was sent to Moscow and examined, a 25X1 fact [redacted] gathered from numerous requests for further information addressed to the various German experts responsible. A demonstration of the schemes was staged at Gorodomlya before members of the Ministry and Institute 88. [redacted] never heard 25X1 any results of this meeting, apart from some additional tasks connected with project details which were given [redacted] in spring 1950. Included in these tasks was 25X1 a request for detail structural drawings for the R-14 rocket, which [redacted] had to carry out although [redacted] this work was senseless without prior 25X1 experimental data.

Techincal Description of the R-14 Rocket

21. The R-14 rocket was a single-stage ballistics rocket fitted with a high-pressure propulsion unit. The external shape was conical, with an opening angle of three to four degrees; the length of the cone was so chosen that the center of pressure and the center of gravity were as close together as possible. For this reason, the power plant projected beyond the rocket tail, which had no fins. The rocket weighed 73 tons; the empty weight was seven tons, including three tons for the useful load (warhead). The fuselage consisted of a cone stump with an intermediate floor and was made of special sheet steel of high tensile and large notch strength at low temperatures. Because of the position of the center of gravity, the oxygen tanks were placed forward. The lower floor was conical and transmitted the thrust (which acted centrally) to the fuselage. The body of the rocket was rendered statically stable by internal excess pressure. A parallel development using light alloy led to a very much more complicated structure without any reduction in weight.

22. The tail of the rocket was in the form of a truncated cone, which was made of corrugated sheet in order to ensure the necessary compressive strength. The head carrying the useful load could also be separated from the main body. Unfortunately, this necessitated separation by an explosion at fuel cutoff, while in the A-4 the head was fitted with a very light pressure-stabilized cone. The power plant transmitted the thrust via a double knife edge attached to the bottom of the conical fuel tank, and could tilt approximately four degrees about this edge. The combustion chamber worked at 60 atmospheres' excess pressure and furnished about 100-ton thrust on the ground.

23. The inner skin of the chamber was made very thin in order to keep the thermal stressing low. As a consequence, the pressure of the cooling fluid had to be the same as that of the combustion gases at every point of the chamber. This was achieved by subdividing the cooling fluid (alcohol) into three circuits, one taking alcohol out of the tanks for the cooling of the discharge nozzle while the cooling of the narrowest section was carried out by alcohol from the first stage of the pump. The cooling of the combustion chamber proper was carried out with alcohol from the second stage of the pump. The injection nozzles were of relatively simple design, since at these high chamber pressures mixing was more important than atomization. The complete combustion chamber approximates in size and weight that of the A-4. Both pumps (alcohol & oxygen) were two-stage and the turbine driving them was fed with exhaust gas bled from the combustion chamber. The turbine exhaust gas at about five atmospheres' excess pressure was led to two small nozzles which could be tilted and, thus, control rotation of the rocket. At fuel cutoff, the main valves were closed by means of an exploding cartridge. Detailed mathematical investigation showed that large losses in range occurred as soon as the mixture strength departed from its optimum value. This was not because of the relatively small resulting change in thrust, but because of change in the quantity of fuel remaining at cutoff. For this reason, rockets intended for maximum range were fitted with special fuel meters in both tanks. These meters regulated the fuel consumption so that both tanks became empty at the same time. This control was effected via the two turbine governors for the two fuel pumps, which governors had to be fitted in any case in order to control the total flow so as to ensure constant combustion pressure. Calculation also showed that the acceleration for the test section of the trajectory was too large for the fuel tanks and exhaust nozzle of the combustion chamber. For this reason an accelerometer was fitted, which governs the flow instead of the latter's depending on combustion pressure. This take-over took place at 10 g and ensured that this acceleration was not exceeded. The measuring part of the control gear was designed on the same lines as that of the R-10 and needs, therefore, no separate description. Control in elevation and azimuth was obtained with the help of two hydraulic motors which were operated with high pressure alcohol and which could tilt the whole power plant about the knife edge already described. Rotation about the longitudinal axis was controlled by the two nozzles passing the turbine exhaust already mentioned.

24. The ground equipment for this rocket was also designed. In principle, such rockets could be fixed using a motorized unit, and the necessary vehicles for such a convoy were designed. [redacted] such a convoy had to be rejected on military grounds. It is much better to fire such a rocket straight from the factory where it was made. We had, therefore, made a design for such an underground assembly comprising stores for spare parts, complete missiles, alcohol store, oxygen plant, and firing posts. 25X1

Development Principles of the R-14 Rocket

25. The underlying principles of the development program of the R-14 rocket were similar to those of the R-10. Some points deserve special mention. The external shape of the R-14 departed considerably from the normal. [redacted] for rockets of this range the impulse loss because of air resistance amounted to only approximately three per cent of the total driving impulse. At the same time, it was no longer necessary to provide dynamic stability, provided only that the distance between the center of pressure and the center of gravity was sufficiently small. For this reason [redacted] could adopt the conical form for the rocket, which, compared with the usual form, was sheer joy to the manufacturer. Furthermore, it was generally held up to now that the ratio thrust/take-off weights should be approximately two. This assumption was wrong, since it did not take into account the dependence of the "empty" weight on the thrust for reasons of strength. [redacted] discovered (although it must be admitted that [redacted] investigations were very rough) that values as low as 1.2 for this ratio could give optimum results under certain conditions. 25X1 25X1 25X1 25X1

26. In addition to the Skizzen Project for the R-14, an alternative solution of the problem in form of project R-15 was submitted in the Avant form. The R-15 is a glider which is brought to the necessary altitude and speed by means of assisted take-off. A jet drive then takes over. The take-off is carried out with the help of an A-4 power plant, complete with tanks and jet rudders for course deviation. This A-4 unit is jettisoned after fuel cutoff. The main power plant is designed in the form of a Lorin unit, using combustion chambers of the Ju 04. The glider is intended to fly at a constant altitude of 14 kilometers and eventually is caused to crash on the target. Course stabilization by means of gyros will be controlled by means of long-distance directional radio.

27. This flying bomb had a very obvious advantage: it was smaller, lighter, and required much less fuel than the ballistic rocket. But [redacted] it also had decisive disadvantages. At first [redacted] still far from clear in the project as to the type of control to be fitted. It was obvious that such a control was much more complicated than that of the rocket. If, as was intended, the radio control was to be effected right up to the target, then interference should be relatively simple. Finally, the glider could be shot down by a fighter aircraft or suitable antiaircraft rockets. For this reason [redacted] refused to take a personal part in any subsequent development of this project. The scheme was nevertheless studied with great attention by the Soviets and [redacted] Chief Designer Korolov was working on a similar project. 25X1 25X1 25X1 25X1 25X1

Other Work

25X1

28. In addition to the main problems described above, a large number of smaller tasks were given [redacted] Thus, [redacted] started an antiaircraft rocket project in autumn 1950. This was of no great importance. Finally, in summer 1951, [redacted] reorganized to deal with non-military problems. Toward the end [redacted] in autumn 1952, two tasks were given [redacted] which may be of importance [redacted] The first problem concerned the design of a stathoscope, i.e., an instrument for maintaining constant barometric height on a body in flight. The second problem concerned an improved gyro, following the concept of the 84-minute pendulum, i.e., a gyro for long operative periods. At the time [redacted] left, both these instruments had reached the final development stage. 25X1 25X1 25X1 25X1

Conclusions

29. The above summarizes the most important projects [redacted] since the conclusion of the war. Before I touch on the answer to the questions passed 25X1

[redacted] would like to analyze briefly the peculiar attitude of the Soviets to rocket technique. There is no doubt that the interest taken by the Soviet intelligentsia in rockets is far greater and much more intimate than was the case in Germany. We can talk of a real and general love of the problem, such as was found in Germany only in the case of a very small circle of people. [redacted] the early work of Zyalkovskiy or the excellent powder rocket technique of the Soviets in World War II. If the general level of technics had been high enough, there is no doubt that the Soviets would have been the first to utilize long-distance rockets. This attitude of mind explains [redacted] accounts for the fact that the R-10 project was submitted to Stalin before its completion. In addition to the R-10, some other projects were probably submitted to the Soviet High Command. However, the Sanger-Bret Project is the only other project which [redacted] was submitted to the High Command. 25X1 25X1 25X1 25X1

30. Besides this love for rocket technique, there exists a second mental consideration which affects Soviet decisions, and that is respect for work in the West, especially German work. Data emanating from Germany were regarded as almost sacrosanct. 25X1

31. [redacted]

32. Any conclusions drawn [redacted] must not, therefore, be regarded as final and correct. The Soviets are masters of camouflage and it is quite possible that lack of interest, for example, was shown on purpose to mislead [redacted] Taking all thi[redacted] in mind [redacted] final conclusion is the following: 25X1 25X1

a. The Soviets possess a rocket of the type R-10 which is beyond the development stage, with which firing trials have been carried out, and which is either ready for series production or already in production.

b. The Soviets will attempt to solve the problem of the 3000-kilometer rocket with three-ton useful load (presumably atomic warhead) by using a glider with assisted take-off. [redacted] not think that this scheme has yet reached the stage of firing trials. 25X1

c. Against the ballistic rocket, the only method of defense is air supremacy in the firing region. This constitutes [redacted] an effective safeguard. 25X1 All other methods are completely useless. In the case of the glider, if the control is by radio, then interference must always be possible by means of special transmitters. If the glider operates automatically (this autonomous operation is feasible in the case when an atomic head is fitted), then it should be possible to combat it by means of fighters or rockets so that it is shot down over relatively unimportant territory.

33. Leading Soviet Rocket Experts

a. Pobedonostsev, Yuriy Aleksandrovich

Colonel.

[redacted] 25X1

Leader of the Rocket Commission in 1945 - 1946 in Berlin. After 1946, Chief Engineer of Institute 88 up to 1950. Professor of Aerodynamics at Moscow University.

[redacted] 25X1

b. Korolov

Colonel. 25X1

[redacted]

His primary task on arrival in the USSR was the preparation for the Kapustin Yar firing tests, of which he was the leader.

Subsequently Chief Designer at Institute 88. Probably still holds this post.

c. Chertok 25X1

Major.

[redacted]

Leader of the Special Commission in Bleicherode and started Institute Raabe.

In Moscow he was chief of electrical instruments for all types of rockets and he probably still holds this post.

d. Umanskiy

Lieutenant Colonel.

[redacted] 25X1

Prepared the FMS trains. He was in charge of the Power Plant Section in Institute 88 (for all rocket types). Probably holds this post at present.

34. Leading Soviet Administrators in the Rocket Field

a. Ustinov

General.

Minister of Armaments.

25X1

[redacted]

Ustinov is said to have been director of a large Leningrad concern before he became Minister.

b. Gonor, Lev

General. 25X1

[redacted]

Gonor had no connection with rocket matters in Germany after the war. He was probably the director of Institute 88 at that time. At any rate, he was the director [redacted] and held this post up to 1950. 25X1

[redacted]

c. Gaydukov

General. 25X1

Medium size, fair hair, not over stout.

[redacted]

Was leader of the Special Commission in Nordhausen in 1945 and was reported to have been a leading member of the Commission on Rockets, which came directly under the Council of Ministers.

[redacted] heard that he was killed in a motor car accident in 1951 or later.

1. [redacted] Comment. [redacted] probably meant the German word Vertikant, which is a gyroscope. 25X1

25X1